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INTRODUCTION TO A SPECIAL SECTION

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Dr. Robert C. Thunell: A 40-Year Career of Outstanding Science, Service, and Education in *Paleoceanography and Paleoclimatology*

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This special issue of *Paleoceanography and Paleoclimatology* is dedicated to Dr. Robert C. Thunell for his many contributions to the fields of marine geology, micropaleontology, chemical oceanography, and climate system science.

Bob was a highly respected researcher and educator whose commitment to service impacted many throughout the community. His scientific contributions resulted in advances that substantively influenced our understanding of how the Earth has changed throughout time and his science, leadership, and mentorship has created ripples that will continue to be influential in the years to come (Figure 1). Bob's outstanding 40+-year career included more than 45 research grants (>\$13 million), which he used to support a diverse and numerous pool of 50 graduate students, postdoctoral scientists, and undergraduates (Appendix A).

Bob's many research honors included Fellow of the Geological Society of America (1987), the W. Storrs Cole Research Award (Geological Society of America, 1991), the title of Carolina Distinguished Professor in 1992, the University of South Carolina Education Foundation Research Award in 1997, and the Russell Research Award for Science and Engineering in 2004. Bob was named a Fellow of the American Geophysical Union in 2006, an American Association for the Advancement of Science Fellow in 2010, and was awarded the Carolina Trustee Professorship in 2010. In 2013, Bob received the Distinguished Achievement Award from the University of Rhode Island.

His impact on the community extended beyond research. Bob was a tireless promoter and supporter of Ocean Sciences and Paleoceanography nationally and internationally via his service on a multitude of panels, special committees, journal editorial boards, and in his final appointment as the Senior Associate Dean for Natural Sciences at the University of South Carolina.

He was particularly renowned for his mentorship and guidance. He consistently looked out for the best interests of his formal and informal mentees, steering opportunities their way, and always going that extra mile to help them achieve their goals. Bob's mentees have found careers throughout academia, the private sector, government, and nongovernmental organizations, holding positions that include not only professors and researchers at liberal arts colleges and large research institutions but also museum researchers, federal program managers, and top industry executives.



Figure 1. Bob on board the B/O Hermano Gines in the Cariaco Basin, Venezuela.

This biographical summary of Bob's career is the result of numerous collaborations with graduate students, postdocs, and colleagues.

1. Education

1.1. University of Rhode Island's Graduate School of Oceanography

Bob was a prolific researcher throughout his career. After Bob received his BA in Geology and Biology from Brown University in 1973, he began his graduate work at the University of Rhode Island's Graduate School of Oceanography with Dr. James P. Kennett. His MS work focused on the dissolution of calcium carbonate in the western Gulf of Mexico. At the time, he was one of Jim Kennett's most promising young graduate students, and he lived up to those high expectations. As Kennett's student, he was immersed in micropaleontology and sedimentology, focusing his research on the Pleistocene history of the Mediterranean Sea. This was very timely because of the recently discovered "Mediterranean Salinity Crisis" of the late Miocene and the interpretation of sapropels as evidence that the basin may have been isolated in the Pleistocene as well.

1.2. Woods Hole Oceanographic Institution

In 1978, Bob became a Postdoctoral Scholar at the Woods Hole Oceanographic Institution working with Dr. Bill Berggren. It was here that Bob first began working with planktonic foraminiferal fluxes collected in sediment traps, along with Sus Honjo and Bill Curry in the tropical Atlantic, central Pacific, and Panama Basin. This was the beginning of his very productive collaboration with Sus Honjo, and Bob capitalized on the scientific insights, samples, and technology that Sus provided.

While studying the paleoceanography of marginal seas, Bob recognized the need to continuously sharpen his tools by conducting ground truth experiments on paleoceanographic proxies. Bob became known for combining paleoceanography with ocean and sedimentary chemistry and for his careful interpretation of results; some of his first papers are regarded as foundational benchmarks in the field. Bob eventually developed his own sediment trap program at his new and permanent home at the University of South Carolina, where his career as an academic flourished.

2. Academic and Research Career

2.1. University of South Carolina

Bob spent his entire career at the University of South Carolina (USC). He joined the faculty as an Assistant Professor in 1979 and was promoted to Associate in 1983 and to Full Professor in 1987 (Figure 2). During his time at USC, he made key findings in nearly a dozen subfields of paleoceanography and marine geochemistry. His data-rich papers remain seminal works in each of these different fields, spanning modern process studies to Cenozoic reconstructions, sediment traps, culture experiments, and Ocean Drilling Program (ODP) cruises. Importantly, Bob also made his mark as a great mentor and through long-standing service to the community from within his university, at a national level, and internationally as a Director and Chair, Editor, Panelist, and Committee Member. His dedication to the field was boundless.



Figure 2. Bob, 1984.

Bob became the Director of USC's Graduate Studies in Geology from 1985 to 1988. In 1988, he became Chair of the Department of Geological Sciences: the first of three consecutive 4-year appointments. This was a time of major change and growth and Bob played a key role ensuring that things were done "right" and that faculty and students were supported and rewarded for their efforts. He bookended his years as Chair with another 4-year term as the Graduate Director. During his tenure as Chair, Bob also served as the Associate Editor of *Marine Micropaleontology*, the *Journal of Foraminiferal Research*, the *Geological Society of America (GSA)* bulletin, and as the Editor for the *American Geophysical Union (AGU)* journal *Paleoceanography* from 1988 to 1992. In other words, Bob maintained a substantial institutional service load while maintaining high professional productivity and advising responsibilities.

Realizing that 20 years of administration was not enough, in 2004 Bob took over as the Director of the Marine Science program. During this time, and under the direction of the Dean, Bob guided the merger of the Department of Earth and Ocean Sciences, the Marine Science Program, and the School of the Environment into what is now the School of the Earth, Ocean and Environment. This was a very difficult and thankless task, which very few people would have agreed to try, and fewer could have accomplished. He was tapped as the first Director of the School and served in that capacity for 2 years. It was then, in 2011, that Bob was appointed as the Senior Associate Dean for Natural Sciences, a position he retained until he stepped down in the summer of 2018. As an Associate Dean, Bob continued to build consensus across the science departments, implementing strategies for interdisciplinary

research and fostering a sense of community. His commitment to new faculty was legendary, and he created numerous workshops to mentor faculty at all levels. In addition, and throughout this time, Bob continued to serve terms as an Associate Editor of *Paleoceanography*, as well as several other key journals in the field: *Marine Micropaleontology*, *Journal of Foraminiferal Research*, and *Bulletin of the Geological Society of America*. He continued to guide and shape the field, including serving as the U.S. representative to the IMAGES Scientific Steering Committee and on the National Science Foundation Marine Earth System History Steering Committee. The extent of his activities was significant, reflecting the breadth of his knowledge and impact.

Given all of his administrative positions and teaching responsibilities, it is truly remarkable that Bob maintained a very successful research program working alongside his students and staff on more than 40 research cruises and field seasons around the world and publishing over 230 journal articles and book chapters on topics ranging from reconstructing ocean temperatures and deep ocean circulation to Cenozoic volcanism (Appendix B). His work has been cited over 18,000 times.

Bob's contributions to paleoceanography, paleoclimatology, and marine chemistry spanned a wide range of topics and various large spatial and temporal scales. His research included studies of marine sediments during the Cretaceous-Tertiary Boundary and the Quaternary, particularly the last glacial period, the last glacial transition, and the modern day, where he was a leader in developing and ground truthing paleoceanographic tools by studying the biogeochemistry of sinking particles collected in sediment traps. While many of his papers focused on the Cariaco Basin and the Caribbean, the Gulf of Mexico, Gulf of California, and the Mediterranean Sea, he also conducted research in Italy, the Arctic,

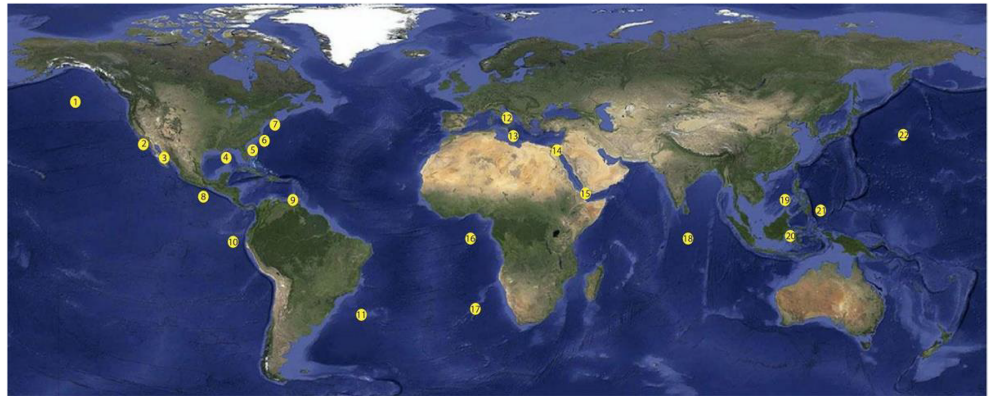


Figure 3. Locations where Bob Thunell conducted research. 1. Station Papa (1984–1988); 2. California Borderlands (1989–Present); 3. Gulf of California (1990–1998); 4. Gulf of Mexico (1975–1983); 5. Carolina Coastal Plain (1979–1982); 6. Western North Atlantic (1999–2002); 7. New Jersey Margin (1994–1997); 8. Gulf of Tehuantepec (1999–2002); 9. Cariaco Basin (1995–2016); 10. Eastern Tropical Pacific (1994–2017); 11. Vema Channel/Rio Grande Rise (1981–1983); 12. Southern Italy and Sicily (1985–1992); 13. Mediterranean Sea (1977–1988); 14. Gulf of Suez (1985–1987); 15. Red Sea (1984–1986); 16. Eastern Equatorial Atlantic (2004–2006); 17. Walvis Ridge (2007–2011); 18. Indian Ocean (1984–1986); 19. Western Pacific Marginal Basins, Sulu and South China Seas (1983–1993); 20. Indonesian Throughflow (1999–2019); 21. Western Equatorial Pacific (1989–1992); 22. Shatzky Rise (1983–1985).

the South China and Sulu Seas, the Gulf of Aden, the Panama Basin, and the Indonesian Throughflow (Figure 3).

Throughout Bob's career, his door was always open. Always. It was this open door policy, which extended to faculty, staff, and undergraduates, which made Bob the proudest. For 37 years, coffee was held every morning in the Thunell lab. For those with the good fortune to have worked there, some of the fondest memories of Bob are likely from these coffees. Everyone was welcomed: some were regulars while others floated in and out over the years, but Bob was always there. The conversations ran from science to sports, from TV series to recipes, and always something about family. It was where people announced they were having children and years later announced where those children were going to college. Faculty announced that they had a grant funded, and students their job offers and rejections. People talked of their vacations, they told jokes, and ultimately, it was where Bob announced his illness. But he never stopped coming to coffee. In fact, toward the end, if there was only one thing he could do in the day, it was to come into the lab to share laughter around the coffee pot. He was always there, and his door was always open.

In closing, this special volume highlights Bob's long and highly distinguished career. He will always be remembered as a fair, kind, fun, and compassionate man. He is greatly missed by those fortunate enough to have known him as a colleague, mentor, teacher, and friend.

As impressive as his career is to us, what mattered most to him was his family: his wife of over 40 years, Maureen, and his three children, Matthew, Thomas, and Daniel. There was not a day we did not hear about one of them. A devoted husband and the proudest of fathers, he had his priorities exactly right.

We send our heartfelt sympathy to his family and thank them for sharing Bob with us and with the science community.

Appendix A

Table A1 lists the graduate students and postdoctoral investigators supervised by Bob Thunell.

Table A1
Graduate Students and Postdocs

Year	Name	Degree	Year	Name	Degree
Graduate students receiving degrees					
1982	D. Boylan	MS	1998	E. Emmer	MS
1983	M. Katz	MS	2000	E. Kincaid	MS
	C. Morgan	MS	2001	J. Friddell	PhD
	E. Neff	MS	2002	K. Tedesco	PhD
1984	E. Tappa	MS		K. Visser	MS
	B. Linsley	MS		B. Perlet	MS
	L. Reynolds	MS		S. Healy	MS
1985	J. Gerstel	MS	2003	M. McConnell	MS
1986	S. Locke	MS	2005	A. Elmore	MS
	J. Wright	MS	2006	G. Kendrick	MS
1987	J. Smale	MS	2008	M. McConnel	PhD
1988	M. Howell	PhD		M. Hardee	PhD
1990	L. Sautter	PhD	2009	A. Newton	PhD
1991	J. Smale	PhD	2011	A. Pusz	PhD
1992	D. Gellar	MS	2013	K. Wejnert	PhD
1993	Q. Miao	PhD	2015	B. Marshall	PhD
1994	G. Mortyn	MS	2017	E. Osborne	PhD
	D. Patrick	MS	2019	M. Lis	MS
1997	B. Christensen	PhD			
	C. Pride	PhD			
Postdoctoral investigators supervised					
1990	L. Sautter	Postdoc	1998–2002	D. Black	Postdoc
1990–1992	D. Anderson	Postdoc	2013	K. Wejnert	Postdoc
1993–1995	P. Ziveri	Postdoc	2012–2016	K. Gibson	Postdoc
1993–1995	H. Wang	Postdoc	2015–2017	M. Bringue	Postdoc
1992–1997	J. Le	Postdoc	2016–2017	J. Ontiveros	Postdoc
1996–1999	S. Poli	Postdoc	2017–2019	K. Davis	Postdoc

Appendix B

The following is a chronological list of Bob Thunell's publications.

- Kennett, J. P., & Thunell, R. (1975). Global increase in Quaternary explosive volcanism. *Science*, *187*, 497–503. <https://www.jstor.org/stable/1739130>
- Thunell, R. (1975). Calcium carbonate dissolution history in Late Quaternary deep-sea sediments, western Gulf of Mexico. *Quaternary Research*, *6*, 281–297. [https://doi.org/10.1016/0033-5894\(76\)90055-7](https://doi.org/10.1016/0033-5894(76)90055-7)
- Thunell, R. (1976). Optimum indices of calcium carbonate dissolution in deep-sea sediments. *Geology*, *4*, 525–528. [http://doi.org/10.1130/0091-7613\(1976\)4<525:OIOCCD>2.0.CO;2](http://doi.org/10.1130/0091-7613(1976)4<525:OIOCCD>2.0.CO;2)
- Kennett, J., McBirney, A., & Thunell, R. (1977). Episodes of Cenozoic volcanism in the Circum-Pacific region. *Journal of Volcanology and Geothermal Research*, *2*, 145–163. [http://doi.org/10.1016/0377-0273\(77\)90007-5](http://doi.org/10.1016/0377-0273(77)90007-5)
- Kennett, J., & Thunell, R. (1977). Explosive Cenozoic volcanism and climatic implications. *Science*, *196* (4295), 1231–1234. *JSTOR*, www.jstor.org/stable/1744642.
- Kennett, J., & Thunell, R. (1977). Comments on Cenozoic explosive volcanism as related to east and south-east Asian arcs. *American Geophysical Union Maurice Ewing Series 1*, 348–352.
- Thunell, R., Williams, D., & Kennett, J. (1977). Late Quaternary paleoclimatology, stratigraphy and sapropel history in eastern Mediterranean deep-sea sediments. *Marine Micropaleontology*, *3*, 371–388. [http://doi.org/10.1016/0377-8398\(77\)90018-4](http://doi.org/10.1016/0377-8398(77)90018-4)
- Thunell, R. C. (1978). From Dead Sea saltness to freshwater floods in the Mediterranean. *Maritimes*, *22*, 3–5.

9. Thunell, R. (1978). Distribution of Recent planktonic foraminifera in surface sediments of the Mediterranean Sea. *Marine Micropaleontology*, *3*, 147–173. [http://doi.org/10.1016/0377-8398\(78\)90003-8](http://doi.org/10.1016/0377-8398(78)90003-8)
10. Williams, D., Thunell, R., & Kennett, J. (1978). Periodic fresh water flooding and stagnation of the eastern Mediterranean Sea during the Late Quaternary. *Science*, *201*(4352), 252–254. *JSTOR*, www.jstor.org/stable/1746288.
11. Thunell, R. (1978). Late Quaternary calcium carbonate dissolution history, Gulf of Mexico. In H. B. Stewart Jr. (Ed.), *Symposium on Progress In Marine Research in the Caribbean and Adjacent Regions* (pp. 429–444). Rome, Food and Agriculture Organization of the United Nations.
12. Thunell, R. (1979). Pliocene-Pleistocene paleotemperature and paleosalinity history of the Mediterranean Sea: Results from DSDP Sites 125 and 132. *Marine Micropaleontology*, *4*, 137–187. [http://doi.org/10.1016/0377-8398\(79\)90013-6](http://doi.org/10.1016/0377-8398(79)90013-6)
13. Thunell, R. (1979). A glacial reconstruction of the eastern Mediterranean Sea, 18,000 years B. P. *Quaternary Research*, *11*, 353–372. [http://doi.org/10.1016/0033-5894\(79\)90080-2](http://doi.org/10.1016/0033-5894(79)90080-2)
14. Thunell, R., & Williams, D. (1979). Faunal and oxygen isotopic evidence from surface water salinity changes during sapropel formation in the eastern Mediterranean. *Sedimentary Geology*, *23*, 81–93. [http://doi.org/10.1016/0037-0738\(79\)90007-1](http://doi.org/10.1016/0037-0738(79)90007-1)
15. Thunell, R. (1979). Climatic evolution of the Mediterranean Sea during the last 5.0 million years. *Sedimentary Geology*, *23*, 67–79. [http://doi.org/10.1016/0037-0738\(79\)90006-X](http://doi.org/10.1016/0037-0738(79)90006-X)
16. Thunell, R., Sparks, S., Federman, A., & Williams, D. (1979). The age, origin and volcanological significance of the Y-5 ash layer in the Mediterranean. *Quaternary Research*, *12*, 241–253.
17. Thunell, R., & Lohmann, G. (1979). Modern biogeography of the planktonic foraminiferal fauna associated with late eastern Mediterranean. *Nature*, *281*, 211–213. <http://doi.org/10.1038/281211a0>
18. Keigwin, L., & Thunell, R. (1979). Middle Pliocene climatic change in the western Mediterranean from faunal and oxygen isotopic trends. *Nature*, *282*, 294–296. <http://doi.org/10.1038/282294a0>
19. Thunell, R. (1980). Mediterranean Neogene planktonic foraminiferal biostratigraphy: Quantitative results from DSDP Sites 125, 132 and 372. *Micropaleontology*, *25*, 412–437.
20. Thunell, R. (1981). Late Miocene - Early Pliocene planktonic foraminiferal biostratigraphy and paleoceanography of low latitude marine sequences. *Marine Micropaleontology*, *6*, 71–90. [http://doi.org/10.1016/0377-8398\(81\)90012-8](http://doi.org/10.1016/0377-8398(81)90012-8)
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26. Thunell, R., & Williams, D. (1982). Paleoceanographic events associated with Termination II in the eastern Mediterranean. *Oceanologica Acta*, *5*, 229–233.
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